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DEFECTS FOUND IN DRAFTED MEN[1]

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I. STATEMENT OF THE PROBLEM

THE ideal population of any country is one in which all the inhabitants are physically sound, mentally competent and temperamentally controlled. Actually, the condition of any population comes far from meeting the ideal. Witness the army of doctors, the cities of hospitals, the thousands of court-houses, jails and penitentiaries. Those persons who come to the notice of such physicians and such institutions are more or less sporadically or even accidentally brought to notice. Any survey of the physical, mental and temperamental health of a large section of the population taken without selection had until recently not been made. A complete survey of the defects in the American population which would give information would be of importance for many interests. Such knowledge would be important from the standpoint of social and industrial life, since it would give some insight into the suitability of the population for the various occupations which our social organization requires.

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[1] This study is based on data recorded on Form 1010 of the office of the Provost Marshal's General and Surgeon General of the Army. Acknowledgments are made to Colonel James Easby-Smith, Colonel Frank H. Wigmore and Colonel Frank R. Keefer, of the Provost Marshal General's Office. The statistics were prepared in the Section of Medical Records, Medical Department, U. S. Army, compiled under the direction of the Surgeon General, M. W. Ireland, and published with his permission. This paper is extracted from the Introduction of a larger work which is to appear shortly under the same title as a Congressional document.

It would have social-medical bearings, since it would indicate the physical and mental status of our population in different parts of the country, amid different sanitary conditions and with varying opportunities for medical and surgical treatment. It would have important military bearings since it would indicate the proportion of men available for military service of various kinds. It would have social-therapeutic bearings, since it would indicate the size and nature of the task before those who would seek to improve, by better conditions, the physical and mental standings of our population. Finally, it would have a biological and eugenical significance in so far as it would reveal the inherent failures in man to make complete adaptation to the rapidly advancing requirements of a highly artificial civilization, the constitutional limitations of the various races to meet the conditions imposed by that civilization, and the influence of military selection on the breeding stock of the next generation.

II. METHOD

The emergency of a great war, however, made necessary the drafting of 3,000,000 men. This included all kinds of men outside of institutions between the ages of eighteen and thirty years. Military necessity demanded that careful physical and mental examination be made of these men in order to eliminate those who would not be fit for the severe service which they would be called upon to perform. The examination was made by physicians in thousands of local boards and dozens of camps for a period of over one year. Each man was examined by one physician and in many cases by from four to twelve. These physicians were often specialists and each rendered a verdict upon the man's physical condition, and, in case a significant blemish was found, whether important enough to prevent acceptance or not, diagnosis of the defect was recorded upon the physical examination form carried by the recruit. The records thus made were sent to the office of the Surgeon General of the Army, copied upon statistical cards, and counted and tabulated. They form the basis of the present study.

The total number of men involved in the present study was about 2,500,000. Of these about 500,000 were rejected by the medical examiners of the local boards, and there are 2 lots of about 1,000,000 each who were examined at mobilization camps, September, 1917, to October, 1918. This number constitutes practically all of those rejected by local boards and about two thirds of those examined by mobilization camps, but it is representative of all. A few men between the ages of eighteen and twenty-one are included, but the great majority are men between the ages of twenty-one and thirty years inclusive. The exact number of men examined to furnish these data can never be precisely known. By a method of approximation based upon statistics of the Provost Marshal General's office and those of the Surgeon General's office, a hypothetical number of 2,753,922 is arrived at, and this is used as the "strength," or total population, upon which ratios are calculated. In the present paper the unit of discussion is the rate of incidence of a particular defect in 1,000 men. The rate 1, therefore, when given as the rate for a defect, means that 1 man out of 1,000 was found with that defect. Since the total of the men is about 2,754,000, "1" means that there were 2,754 men found with the given defect. The rate "2" means that there were twice this number, *i.e.*, about 3,500, etc. In the present paper, rates will usually be given as integral numbers, except in the case of small ratios.

III. RESULTS

It is proposed to consider in turn: first, the relative frequency of the main groups of defects found; secondly, the classification of men in relation to military service on the basis of these defects; and thirdly, the relation of the defects to geographical distribution, occupation and race.

1. *Total Defects Found*

In the total population examined there were found 468 men defective per 1,000 examined. That is to say, over half of the men were found to be without any physical or mental blemish significant enough to be recorded. In some of the men 2 or more defects were noted, so that in the total there are 557 defects noted per 1,000 men examined. The number would have been somewhat higher except for the fact that only one, the major defect, was, in the first million men, copied from the examination form and was used in the present statistics. The number 557 is important because it represents the sum of all of the ratios per 1,000 men examined for the 269 defects and groups of defects that were recognized.

Of the defects found, those of a mechanical sort, involving bones and joints, appendages, hands and feet, were commonest and constitute about 39 per cent., or about two fifths, of all defects. The second place is taken by defects of the sense organs, about 12 per cent.; next come the two great and nearly equallysized disease-groups of tuberculosis and venereal disease, which constitute together 11 per cent.; then follow the cardiovascular diseases and defects, about 10 per cent.; and those that fall into the group of defects of developmental and metabolic processes, also about 10 per cent. Of minor importance are the groups of nervous and mental defects, about 6 per cent.; diseases of the nose and throat, about 5 per cent.; those of the skin and teeth, about 3 per cent.; those of the respiratory organs (other than tuberculosis) 1 per cent.; and "others" about 3 per cent.

The defects of the mechanical group are, as stated, far and away the commonest defects found in examination for military service and they constitute the most important group from the military point of view. As stated, the group includes about two fifths of all defects and 218 out of every 1,000 men examined showed some important defect belonging to this group. Numerically the most important item in this group, and indeed in the whole list of defects found in young men, is that of weak feet, including various forms. Of these, there were over 300,000 cases noted, constituting more than half of the group of mechanical defects and giving a rate of 124 per 1,000 men examined. That is, one eighth of the men examined had weak feet. As for other mechanical defects, deformed and injured appendages were found in over 50 men per 1,000, and hernia in 40 per 1,000.

Of the group of defects of the sense organs, about half were refractive errors of the eye, and one fourth were defects and diseases of the ear, including deafness.

Tuberculosis gave a rate of 30 per 1,000, constituting over 5.4 per cent. of the defects found. Venereal diseases gave a rate of 32, nearly 5.8 per cent. of the defects.

Of the developmental and metabolic defects, the most important are: weight below the standard required for military service, under-height, curvature of the spine, goiter (both simple and exophthalmic), defective chest measurement, imperfect development of the genitalia, and cleft palate and hare lip. There were 73,000 men found to be below the military standard of weight and this group constitutes about 5 per cent. of the defects found.

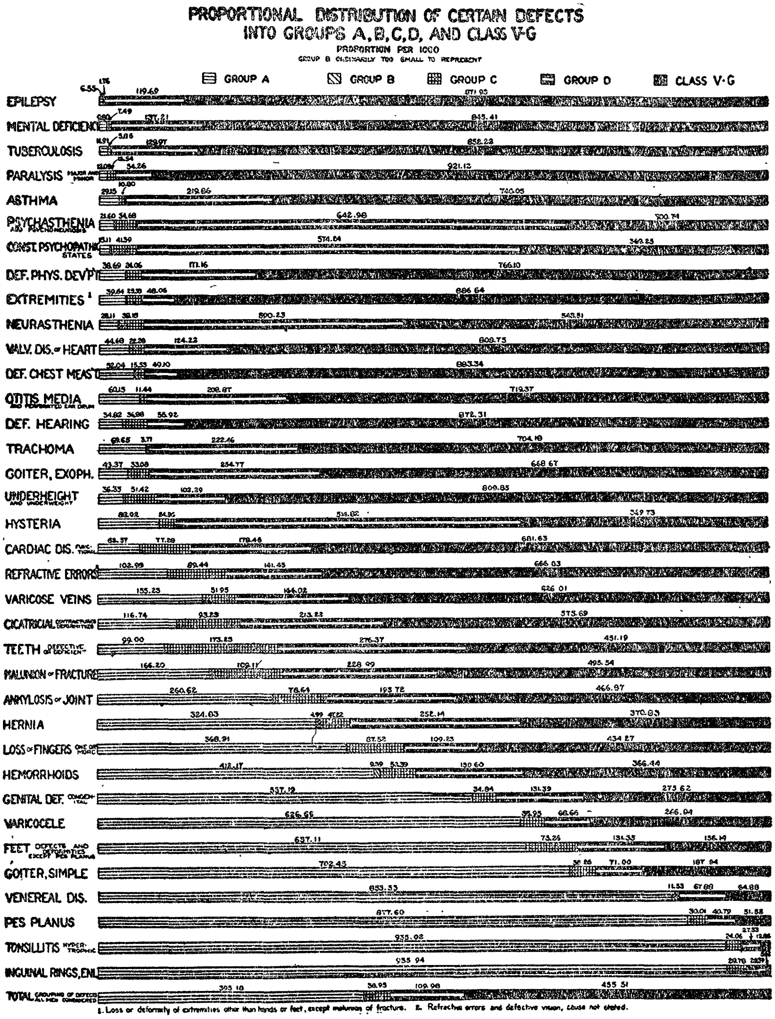
Of the nervous and mental defects, mental deficiency was the most important. It was recorded by medical examiners in nearly 40,000 men, but many more than this were detected in subsequent psychological examinations.

Of diseases of the nose and throat, the most important was enlargement of the tonsils, recorded in 64,000 cases.

Finally, of defects of the skin and teeth, those of the teeth constituted the most important group, including 40,000 men.

This summary of the various groups of defects found in the American population must not be passed by without a word of warning. As was stated above nearly half of the men examined showed a defect considered worthy of remark. It may well be a matter of surprise that not more defects were detected; probably this would have been the case, had the examinations been less expeditiously conducted. Many of the defects were obviously noteworthy only from a military standpoint. From the point of view of civil life, it is no defect that the South Italian is under 60 inches tall, though this constituted a defect from a military point of view. Also many of the defects noted, including most cases of venereal disease and many of the mechanical group, were not of a grade sufficient to render the man unfit for military service. A large proportion of the mechanical defects, important as they are in a man who is to be used as part of a fighting machine, are not a serious handicap in civil life. Also many of the defects of the sense organs that were found are easily capable of correction so as to fit a man to perform his duties in civil life. Altogether it is clear that fully ninety per cent. of the defects found are not of such a nature as to interfere seriously with the man's performing services of the highest order in civil life.

From the standpoint of the Army, as stated, the defects are not equally important. Recognition of this fact led to the establishment of 5 categories by draft and military officials. There was first the so-called Class Vg, the class of men who, on account of physical defects, were rejected by local boards from any military service. These men were not sent to camp. The men received at camp were placed in one of four " Groups," denominated respectively A, B, C, D. Group A includes men who were accepted for general military service. It comprised 2 groups, those in whom was found no defect, and those in whom was found only some minor defect which did not interfere with full military duty. Group B (which became operative only during the latter part of the draft period) included registrants with a defect which would permit of general military service after a cure had been effected by operation or otherwise. Group C included registrants with such defects as would permit them to function only in a special or limited military service in a special occupation or capacity, usually clerical. Finally, group D, included men rejected on physical grounds from any military service. The relation of certain major defects to grouping is shown graphically in Fig. 1. It appears from this figure that nervous and mental defects, including feeblemindedness, mental deficiency, paralysis, psychasthenia, constitutional psychopathic states, and neurasthenia were among the defects, victims of which were most commonly rejected. These are the defects that are incapable of or incompatible with the strain of military training and active service. It doubtless would have been well had none of these been accepted for general military


PROPORTIONAL DISTRIBUTION OF CERTAIN DEFECTS INTO GROUPS A, B, C, D, AND CLASS V-G

PROPORTION PER 1000

GROUP B ORDINARILY TOO SMALL TO REPRESENT

1. Loss or deformity of extremities other than hands or feet, except malunion of fracture. 2. Refractive errors and defective vision, cause not stated.

FIG. 1.

psychopathic states, and neurasthenia were among the defects, victims of which were most commonly rejected. These are the defects that are incapable of or incompatible with the strain of military training and active service. It doubtless would have been well had none of these been accepted for general military service. It is noteworthy that certain of these conditions, like psychasthenia, constitutional psychopathic states, neurasthenia and hysteria, which are difficult to detect, were passed over by local boards and were, therefore, an exceptionally common cause for rejection at mobilization camps. On the other hand, the figure shows that relatively few men were rejected for enlarged inguinal rings (incipient rupture), for enlarged tonsils, for venereal diseases, and even for flat foot. For loss of fingers, hemorrhoids (piles) and hernia (rupture) about one half were rejected and one half accepted for general military service. Among other defects which led to nearly complete rejection were otitis media (inflammation of the middle ear due to infection), valvular diseases of the heart, asthma, paralysis, and, above all, tuberculosis. Altogether about 12 per cent. of the men examined were rejected for any military service.

2. *Distribution of the Defects Found.*

We may now consider briefly the principal results secured concerning the geographical, occupational and racial distribution of the principal diseases and defects. The statistics for each disease have been classified by states, by sections, and by consolidated sections. A word may be said at this point about sections. It was early recognized that most of the larger states could with advantage be divided into one or more sections, depending upon geographical, occupational or racial differences. Sections having similar geographical, occupational or racial conditions were grouped in many cases and for the purpose of further study grouped or consolidated. Some of the findings of these consolidated sections are considered below toward the end of this paper.

1. *Tuberculosis.*—The facts concerning the distribution of this widespread and frequently fatal disease are shown in Fig. 2. It appears at once that the region of highest incidence of this disease is in the desert states of Arizona and New Mexico and the adjacent states of Colorado and California. The reason for this is that the described area includes so many young men who have gone there because they were already victims of active tuberculosis. Perhaps some of the tubercular men are sons of men who have migrated to these states on account of nonresistance to tuberculosis and themselves show the family diathesis. The next most infected territories are the two northernmost Pacific states, the New England states and New York, and the group of states immediately south of the Mason and Dixon

line, including also the states of Missouri, Louisiana, Mississippi and Georgia. New England has long been known as a region with a high rate of tuberculosis, a disease whose fires are fed by the large number of recent immigrants. The states of Virginia, North Carolina, and Kentucky contain numerous sanatoria for the tubercular. The high rate in the Gulf States is probably due to the presence in them of a large proportion of negroes, as this race, particularly the mulatto, is especially susceptible to tuberculosis. The smallest amount of tuberculosis is found in the Great Plains region and the northern part of the Rocky Mountain range. This is an area occupied largely by non-British stock, which comprises exceptionally vigorous people. Tuberculosis in the rural southern states tends to overweigh the rate of tuberculosis in the rural population of the country as a whole. But in general, the agricultural areas of the north show less tuberculosis than the urban districts.

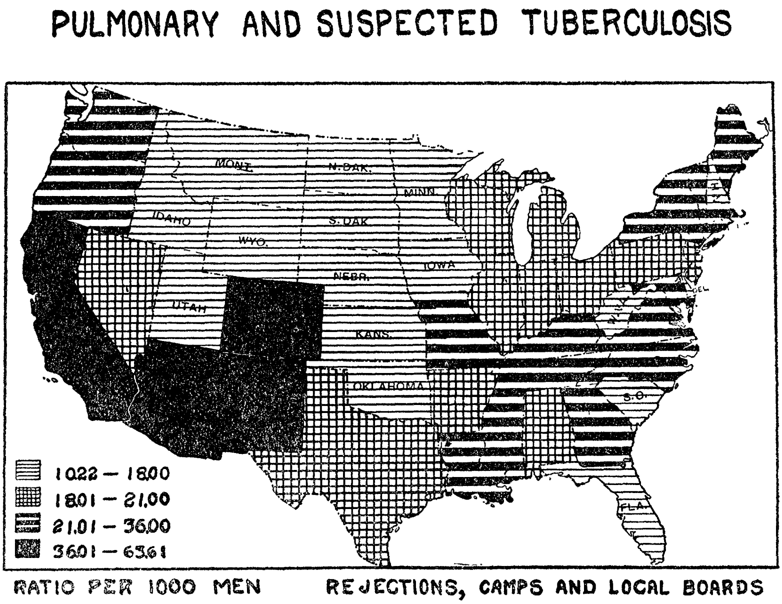


FIG. 2.

2. *Venereal Diseases.*—These diseases have a social interest which far exceeds the military one. Their numbers give a rough index to the success that the different states have met with in their efforts to inculcate the sex mores and the capacity that the population of the different sections have in inhibiting the sex instincts. The details of distribution in different parts

of the country shown in Fig. 3 will repay careful study. This group includes syphilis, chancroid and gonococcus infections, which together give a rate of 32. This rate, or at most the rate of 56 per mille obtained from the second 1,000,000 men alone, must be taken as the most precise information we have concerning the proportion of men in the United States of the ages of eighteen to thirty, who show symptoms of venereal disease at a given time. There is no adequate statistical justification for the statement made by propagandists that 10 per cent., or more, of the men of the United States are affected with venereal disease. No "conservative estimate" can replace, or add anything to, the results of the exhaustive individual examination of over 2,500,000 (probably 2,754,000) men which have led to the figures just quoted. It is to be remembered, moreover, that this rate of 3, or at the maximum 5.6 per cent., includes the colored population as well as white, and there is good statistical evidence that colored men are several times as apt to be infected as white men. As the figure shows, just those states with the largest proportion of colored population have the highest ratio of venereal diseases. Adjacent regions with an intermediate proportion of colored population showed an intermediate amount. Relatively small rates were found in the New England states,

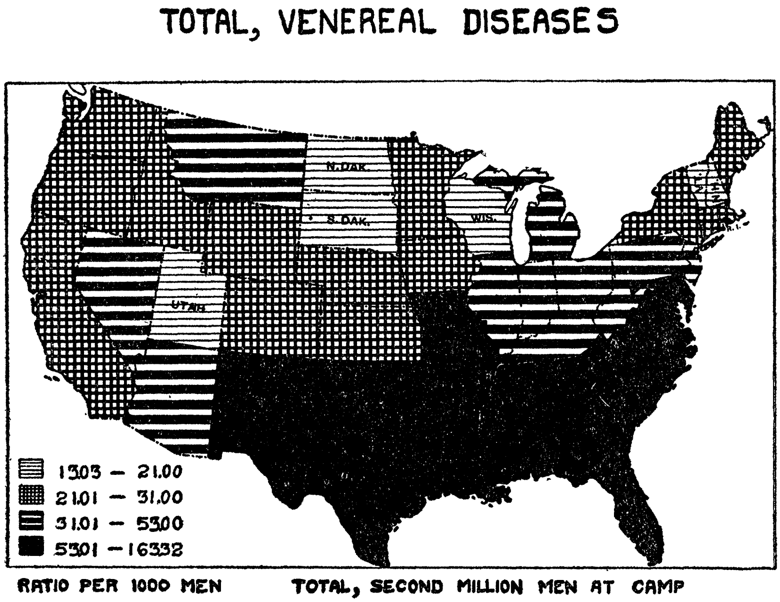


FIG. 3.

including New York, and in the northern states west of the Mississippi River. Wisconsin and the Dakotas, inhabited largely by immigrants from northern Europe, especially Scandinavia, show the lowest rate for these diseases. If the rural rate is a shade higher than the urban rate, it is because the negroes of the south unduly swell the proportion of infected states. In the northern states, like Maine, Massachusetts, New Jersey and Ohio, the rural rate is less than the urban. On the other hand, the venereal disease rate for the eastern manufacturing states, and especially for the commuter sections (rate 1.9) is less than that of the northern agricultural districts; but they are not lower than the rate in those agricultural regions which contain a large proportion of recent immigrants, especially from northwestern Europe.

3. *Goiter.*—Goiter is a disease characterized by an enlargement or a misfunctioning of the thyroid gland which occupies the lower neck region. Two types of goiter are distinguished; simple goiter, characterized primarily by enlargement of the gland, and exophthalmic goiter characterized less by enlargement of the gland than by a nervous, irritable condition, by rapid heart, and by distention of the eyeballs. It was formerly regarded as rather a rare disease in America; it was thought of as a defect which belongs to mountainous regions of Europe. One of the surprises of the draft examination is that many young men, the sex which is relatively the less affected by goiter, should be so affected. There were found over 20,000 cases, giving a rate of about 8 men per 1,000. Not less surprising is the geographical distribution of simple and exophthalmic goiter. It seems that goiter is a disease preeminently of the Great Lakes basin and of the extreme northwest. Goiter is almost absent throughout the southern states from the Cape Fear River to the Colorado. This clean-cut distribution of goiter should help in the solution of its etiology. The area of its greatest incidence in the Great Lakes region nearly coincides with that of the hard waters of the Niagara limestone. But in Oregon and Washington, where the incidence reaches the maximum, the waters are soft. However, the water of the cities of the northwest comes largely from the mountains of the Cascade Range and the Rockies, and mountainous regions are those of the highest incidence of goiter in the European countries. On the other hand, the Great Lakes region is without important mountains. Consequently the presence of lime in the water or the mountain origin of drinking water can neither of them be

considered sufficient or exclusive causes of goiter. It is believed that the distribution of goiter by occupations is subordinate to the geographical distribution. It is not because the men of Washington are largely lumbermen that they have goiter, but it is because they live in the state of Washington. On the other hand, it is not clear that race has no significance in the occurrence of goiter. For not all persons who live in goiterous regions are affected with goiter, and it is possible that there is a selection based on race of those who show the symptoms. There is an excess of goiter among the Scandinavians and the rate is higher still in those sections with a large proportion of Finns, but it must be recognized that the sections inhabited by Finns are

GOITRE, SIMPLE

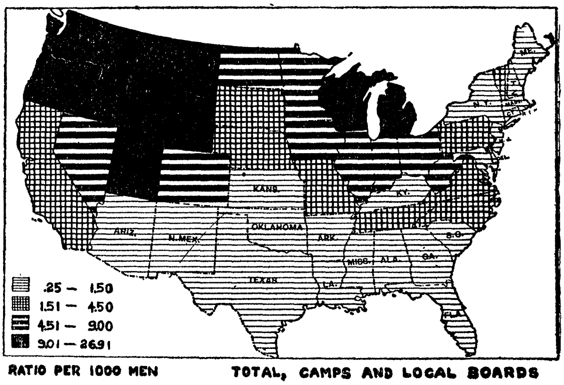


FIG. 4.

GOITER, EXOPHTHALMIC

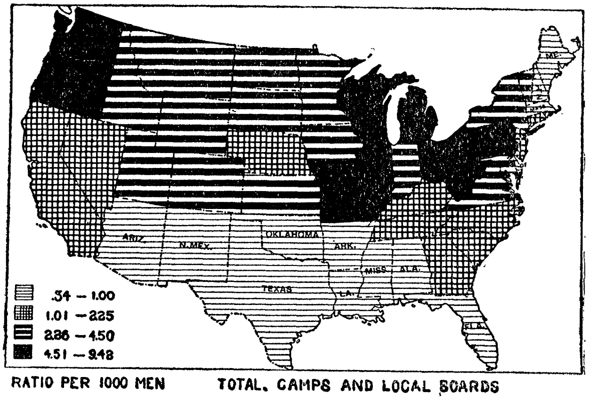


FIG. 4*a*.

both in northern Michigan, a center of goiter. See Fig. 4, simple goiter, 4*a*, exophthalmic goiter.

4. *Curvature of the Spine.*—Though it can not be denied that there are hereditary factors which favor the development of spinal curvature, yet it is probable that a large proportion of the cases are developed under conditions of bad posture. However it is induced, the amount of it found was strikingly large. It occurred on the average 5.5 times in every 1,000 men examined. The map in Fig. 5 shows the distribution of curvature of the spine by states. It appears that New England and the densely populated states about the Great Lakes are regions of high incidence. States of the Great Plains and the Gulf show relatively little curvature of the spine. The low rate in the Gulf states is doubtless due largely to the negro population, which is one relatively little affected with curvature of the spine. In general, the great agricultural regions are less affected than the eastern manufacturing sections. There is a minimum rate in the sparsely settled sections along the Mexican border, which contain a great many Indians and Mexican-Indians. The highest rate, 7 per 1,000, is found in sections having a large proportion of French-Canadians.

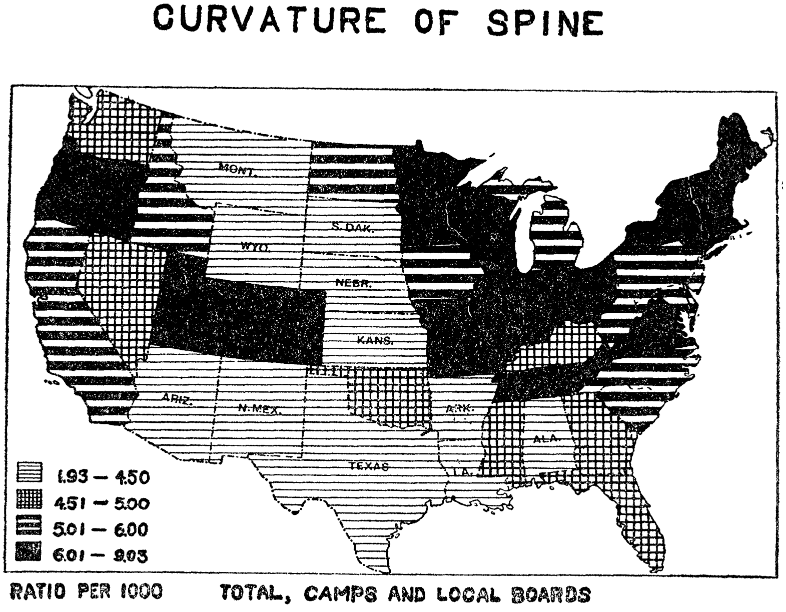
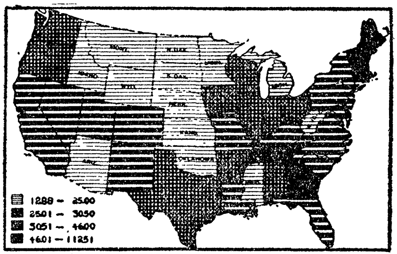


FIG. 5.

5. *Defective Physical Development and Deficient Chest Measurement.*—These terms include a large range of conditions due to a variety of causes. The group is of great significance from a military standpoint, but its numbers are not very large, only about 9,700, giving a rate of about 3.6 per 1,000 men. The group has a great importance for social therapeutics since it is largely due to unhygienic methods of living, although in a considerable part it is due also to congenital defects. The distribution of these defects is shown in Figures 6, 6*a*, 6*b*. The center for defective physical development is found in the states which are grouped around Chattanooga, and it seems probable that the high rate in this territory is largely determined by the presence of hookworm infection. There is another center in New England, and this seems to be controlled very largely by the French-Canadian immigrants, who show a high rate of defective physical development. There is a slight excess of defective physical development (but not of deficient chest measurement) in rural districts. This is doubtless determined by the hookworm infection among the agricultural whites of the south. In the northern states that contain large cities, there is a relatively low urban rate for "defective physical development" which

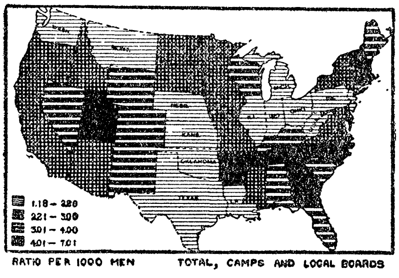
DEVELOPMENTAL DEFECTS[1]



[1] INCLUDING DEFECTIVE PHYSICAL DEVELOPMENT, UNDERWEIGHT, UNDERHEIGHT, DEFICIENT CHEST MEASUREMENT. TOTAL, CAMPS AND LOCAL BOARDS

FIG. 6.

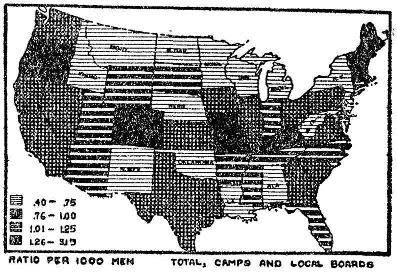
DEFECTIVE PHYSICAL DEVELOPMENT



RATIO PER 1000 MEN TOTAL, CAMPS AND LOCAL BOARDS

FIG. 6*a*.

DEFICIENT CHEST MEASUREMENT



RATIO PER 1000 MEN TOTAL, CAMPS AND LOCAL BOARDS

FIG. 6*b*.

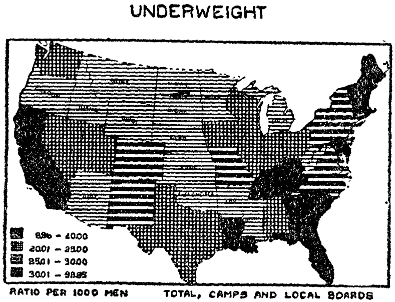


FIG. 7.

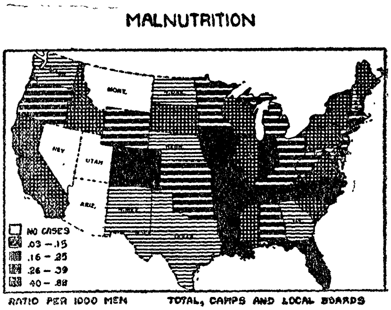


FIG. 7*a*.

may be due to an avoidance of this vague term by physical examiners. There is a relatively low urban rate for deficient chest measurement in rural districts of the north and this may be in part accounted for by the more varied muscular activity of the children who live in the open country.

6. *Underweight.*—The physical examination standards prescribed a minimum weight of 114 (or in certain cases 110) pounds. Many of the registrants, however, were rejected who weighed far more than the lower limit, when their weight was markedly below that of the normal man of their height. Underweight, consequently, included two groups, those who were racially small and those who suffered from malnutrition in the broad sense. Malnutrition was, of course, chiefly the result of parasitism; and altogether there were noted 73,000 men, giving a rate of 27 (Fig. 7*a*). The map in Fig. 7 shows the distribution of underweight in the different states. One obvious center is in New England. This is largely due to the recent immigration to that section of small races like the South Ialians, Portuguese, and Polish Jews. The second center, in the southeast, is chiefly due to hookworm and malaria. The underweight that characterizes the state of California is doubtless chiefly due to

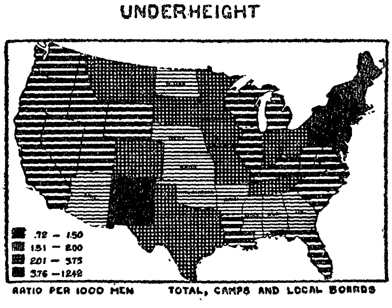


FIG. 8.

tuberculosis, but may in part be due to the presence of small races, like the Japanese. Underweight is prevailingly an urban defect, primarily because the northern cities which tend to control the statistical result are those to which the small races of South Italians and Polish Jews have largely immigrated.

7. *Underheight.*—Stature is determined primarily by racial conditions. Thus, the Scotch are the tallest people on the globe and the South Italians and Polish Jews are among the shortest people of Europe. Stature seems to be practically independent of environmental conditions and, if underheight is commoner in cities than in the country, it is not due chiefly to environmental conditions in urban districts, but to the fact that the short races prefer to live in cities, while the tall Scandinavians and Scotch are largely rural dwellers. The total amount of underheight was not as great as of underweight—only about 8,000 cases, giving a rate of 3 per 1,000 men examined. This is largely because the minimum requirement for military service was, during most of the period of the draft, retained at 60 inches, a stature a little less than the average for males of the short races that have made their home in this country. The geographical distribution of underheight is shown in Fig. 8. New England and the Middle States, the states that have received the greater part of the new immigration, show the largest proportion of presence of underheight. The rate is high on the Pacific coast also, which result may possibly be due in part to the influence of Orientals. Relatively little underheight was found in agricultural districts, especially in the south. The rate is high in the eastern manufacturing and commuter group because of the presence of short races in them. There was a rate of less than 2 in the Scandinavian sections, but a rate of over 8 in those occupied largely by French-Canadians. The condition, while not serious, is also one that can not be altered by any prophylactic measures. If there is any desire to keep down the proportion of our population who are below the stature requirement for military service, it can only be done by restricting immigration of people belonging to short races.

8. *Imperfect Sex Development.*—Of the defects of this group about 8,000 cases were found, making a rate of 3. The defects of this group, congenital in their nature, can not be altered by prophylaxis, and, though remedied by surgical operations, recur in subsequent generations by inheritance. The commonest of these defects is cryptorchidism, or failure of descent of one or both testes. The distribution of these defects is shown in Fig. 9.

This map yields the striking result that the defect predominates in the northern one or two tiers of states west of the Mississippi from Minnesota to Washington. There is also another center of incidence in southern New England. The latter is possibly due to the presence of French-Canadians, since the section in which they are most numerous have a rate for cryptorchidism of over 3. As for the states in the northwest, most of them contain considerable Scandinavian population and the Scandinavian group section also shows a rate of over 3 for cryptorchidism alone.

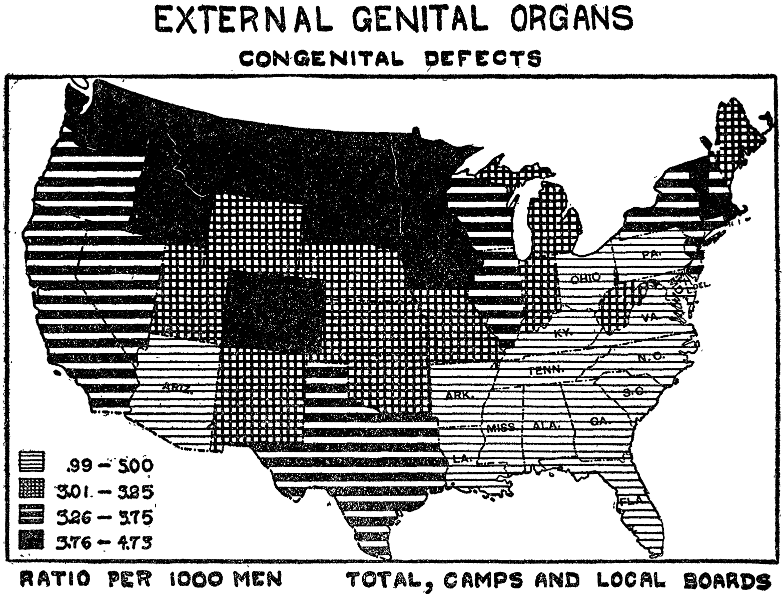


FIG. 9.

In any case, the variations in the rate are to be accounted for on racial grounds. The relatively low rate throughout the south is probably influenced by the presence of negroes, in whom cryptorchidism is relatively uncommon. (?)

9. *Deformed, Atrophied or Lost Arms.*—Serious defects in the arms were found in about 15,000 cases. The loss or deformation of the arms is not only of great military, but also of great civil importance, since it limits a man's activity in industrial life. Indeed, most of the operations of manufacturing and commerce require the use of two arms. Such a defect is entirely prohibitive of military service. The distribution of loss of upper extremities by states is shown in Fig. 10. It is seen that this is common in the states bordering on the Allegheny

Mountains from Pennsylvania to Georgia. It is also found in excessive numbers in the Gulf states from Mississippi westward, and in the state of Washington. The loss of the upper extremity is determined largely by the hazard of occupation. Probably an important reason for loss of the upper extremity along the Allegheny Mountains and in the western Gulf states is

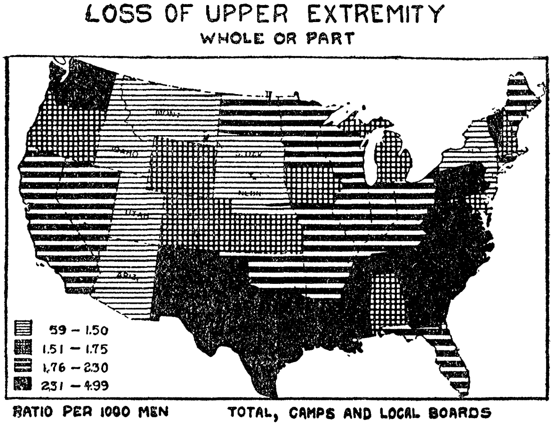


FIG. 10.

the extensive lumbering operations going on in those states, or which have gone on in them during the last ten or fifteen years. Similarly with the state of Washington, which is now the principal lumbering state of the Union. Saw-mills, planing-mills, box factories, all offer special hazards to the appendages. Also in rural communities the opportunity for the proper setting of broken bones is much less than in cities. Consequently, we find faulty union of fractures of the upper extremities relatively common in rural states. Also loss of upper extremity, deformity of upper extremity, ankylosis of joints are all much commoner in rural districts. However, the hazard of cotton mills in the south (in which there seems to have been in the past imperfect protection of workmen) is doubtless responsible for a considerable part of urban loss of arms such as is found in southern cotton mill states and their cities.

10. *Deformed, Atrophied or Lost Legs.*—This defect is 50 per cent. commoner than the preceding defect, showing that legs are more subject to hazards that maim but do not kill than arms. The map showing the distribution of loss of lower extremity, whole or in part, is given in Fig. 11. This figure shows the relatively large incidence of loss of lower extremity in the states of Washington and Utah, and in the mining states

grouped around the head of the Ohio River, and also Virginia. There is more than the average of this defect found in the states from Louisiana northwest to Colorado, while the mining states of Idaho, Wyoming and Montana have relatively little of it. It seems probable that the loss of extremity in the different states is determined in part by lumbering operations and in part by mining. At any rate, the defect is found more predominantly in the rural regions than is loss of the upper extremity. This is probably because there is little danger to loss of lower extremity as compared with loss of upper extremity in cotton and other mills, while the hazard to the lower limbs in various agricultural pursuits is equally great to both pairs of appendages. In centers for railroad shops, like Ogden, Utah, the rate for defective legs is very high.

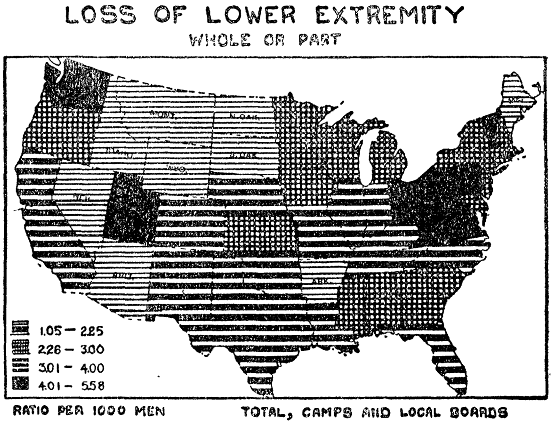


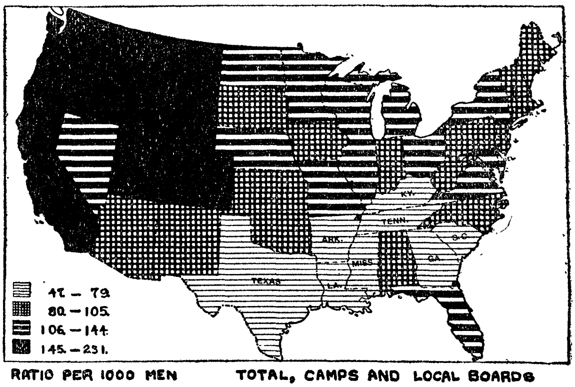
FIG. 11.

11. *Weak and Deformed Feet.*—As already stated, this is far and away the most important defect, numerically and from the standpoint of military service, found in drafted men. It is also of considerable economic importance in civil life, since it handicaps a man in performing duties which require standing on the feet, the very conditions which have induced it in the first place. It is to a great degree dependent upon the wearing of ill-fitting shoes and hence may be combated in the future by propaganda directed toward the reform in the shape of shoes. From the biological standpoint the important breakdown of the feet in the comparatively young male population indicates that the feet are badly adjusted to the demands made upon them in modern civilized life.

The geographical distribution of flatfoot (which controls in this group of defects) is shown in Fig. 12. The one striking fact in the geographical distribution is comparative freedom from foot defects enjoyed by the southern states. This is due both to the comparative absence of shoes in the rural population, during early years of life and to the large colored population which, partly because of such freedom from shoes and partly because of anatomical and physiological peculiarities, is less affected with weak feet than whites. The great center of flat-foot is in the northwest, probably partly on account of the large body-size of immigrants into that territory. For flatfoot, among other things, is induced by the weight of the body which has to be supported. Flatfoot and particularly hammer toe and bent great toe (Fig. 12*a*) are common in the densely populated states

PES PLANUS

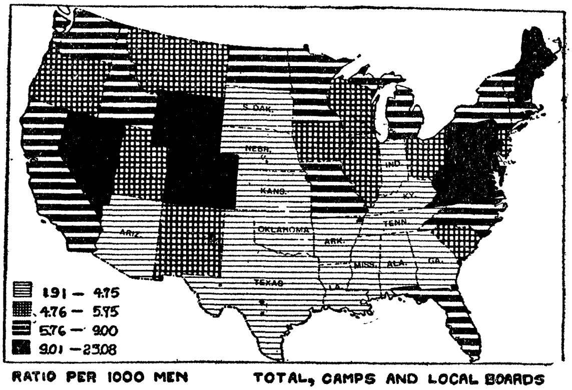
FLAT FOOT



RATIO PER 1000 MEN TOTAL, CAMPS AND LOCAL BOARDS

FIG. 12.

HAMMER-TOE AND HALLUX VALGUS



RATIO PER 1000 MEN TOTAL, CAMPS AND LOCAL BOARDS

FIG. 12*a*.

of the northeast. This is due to the presence in those states of large cities, for bad feet are above all defects of the cities, due to the conditions of life, which make it necessary to stand on the feet, to walk on hard pavements and to perform less varied occupations than the country man is expected to do. Especially in the North there is a more constant use of shoes during the earlier years of life, and of deforming and ill-fitting shoes at all times of life. The racial difference in respect to flatfoot is not striking. It is especially common among the larger races, like the Germans, Austrians, and Scandinavians.

12. *Deformity of Hand or Loss of Fingers.*—Although less important from a military point of view than weak or deformed feet, deformed or absent hand or fingers are of great importance in social life, particularly in the various industries. There were over 20,000 cases of this defect recorded, which means that nearly 8 out of every 1,000 men are defective in this respect. There are 3 principal regions of incidence: first, the New England states; second, the group around the Great Lakes; and third, the group in the northwest. As the defect is much commoner in rural than in urban districts, those states which contain great cities like New York, New Jersey, and Illinois fall below the upper third of states arranged in order of incidence. The defect mentioned is associated in part with the lumbering industry and its associated saw-mills. This is no doubt why the rate reaches a maximum in the state of Washington and why it is very high in Maine, Michigan and Wisconsin. Also it is quite clear that mining operatons are contributory and hence we find a relatively high rate in the states of Montana, Idaho, Wyoming, West Virginia, Ohio and Michigan. The rate in Pennsylvania is kept low by the presence of large cities. The region of the great southwest with treeless plains and deserts is relatively devoid of injury to or deformation of hands. The rate for finger defects is high among the Finns, but that is largely because they are engaged in mining. It is relatively low in the agricultural sections, particularly those made up of native stock.

13. *Hernia.*—The inability of the lower abdominal muscles and fascia to withstand extraordinary strain is an indication of man's imperfect adaptation to the erect position and to the demands made upon him by the severe physical strains of modern civilization. The presence of threatened or frank hernia is one of the greatest defects found in men of military age. It was detected in nearly 40 per 1,000 or 4 per cent. of them, a total of over 100,000 individuals.

The distribution of hernia and enlarged inguinal rings over the United States is shown in Fig. 13. One of the striking facts represented on this map is the great uniformity in the distribution of hernia in the different states. The range is small, varying from a maximum of 29 in Florida to a minimum of 13 in Maryland. Consequently the variations in incidence as shown on the map are apt to be influenced by such incidental matters as idiosyncrasies of examiners at the various camps. Taking the chart as it stands, it appears that there is a high rate for hernia in the Rocky Mountain states, Great Basin and the Pacific slope. Men from these states were all examined at Camp Lewis. On the other hand, these are largely mining states where, there is reason to suspect, the men of military age have been subjected to an unusual amount of heavy work. Similarly, we find that the rate is high in Pennsylvania and West Virginia, mining states; also in most of the New England states, Michigan and Wisconsin. Among the different races considered we find the highest rate among the French-Canadians, Germans, and Austrians, and the lowest rate among recruits of Scotch origin.

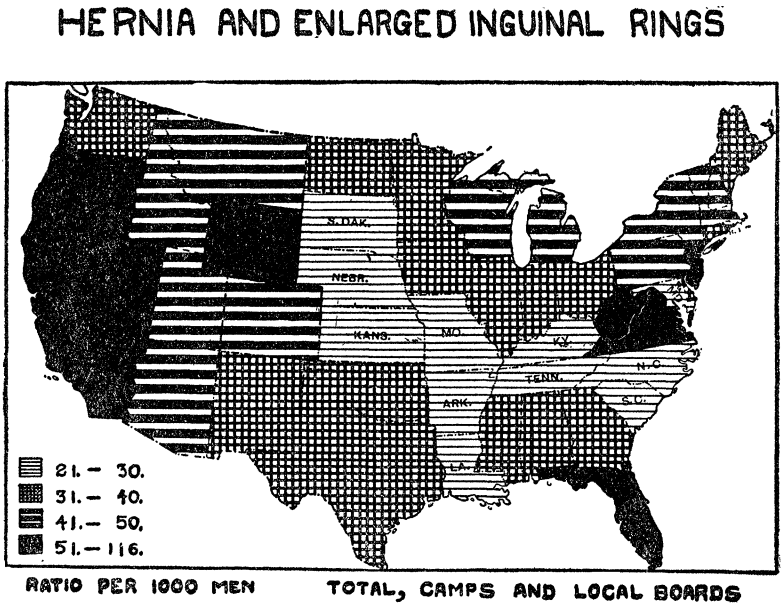


FIG. 13.

(To be Concluded)